EX PARTE OR LATE FILED

ORIGINAL

ORIGINAL

LAW OFFICES
LEVENTHAL, SENTER & LERMAN P.L.L.C.
SUITE 600
2000 K STREET, N.W.
WASHINGTON, D.C. 20006-1809

TELEPHONE
(202) 429-8970

TELECOPIER
(202) 293-7783

WWW.LSL-LAW.COM

March 17, 2000

RECEIVED
MAR 17 2000
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

WRITER'S DIRECT DIAL
202-416-6782

WRITER'S DIRECT FAX
202-429-4626

WRITER'S E-MAIL
SBARUCH@LSL-LAW.COM

VIA HAND DELIVERY

Ms. Magalie Romas Salas
Secretary
Federal Communications Commission
The Portals
445 12th Street, S.W.
Washington, D.C. 20554

Re: **Notification of *Ex Parte* Presentation in**
File No. SAT-LOA-19990108-00007, ET Docket No. 98-206

Dear Ms. Salas:

On March 15, 2000, representatives of Virtual Geosatellite, L.L.C. ("Virtual Geo") met separately with officials from the Commission's Office of Engineering and Technology ("OET") and the Commission's International Bureau ("IB") on matters pertaining to Virtual Geo's above-referenced application and the above-referenced rulemaking proceeding. Among those attending the meeting on behalf of OET were Julius P. Knapp, Geraldine A. Matise, Thomas Derenge, and Bruno Pattan; attending the separate meeting on behalf of IB were Donald Abelson, Cecily Holiday, Harry Ng, Peter Papas, Kimberly Baum, and Jennifer Gilsenan. In each meeting, Virtual Geo was represented by Gerald Helman, Jay Brosius, Richard Barnett, Raul Rodriguez, and the undersigned.

Virtual Geo's presentation concerned the manner in which the proposed Virtual Geo satellite system, known as "Virgo," would utilize fixed-satellite service spectrum on a shared basis with geostationary, non-geostationary, and terrestrial systems. Virtual Geo also discussed related matters pertaining to the policy decisions to be taken in the Commission's Ku-band rulemaking proceeding in ET Docket No. 98-206, along with associated matters relating to Virtual Geo's pending petition for rule making concerning use of C-band spectrum for non-geostationary fixed-satellite service systems. The presentation of which copies are attached hereto was given orally at this meeting.

Please contact me if there are any questions.

Respectfully yours,

Stephen D. Baruch

Enclosure

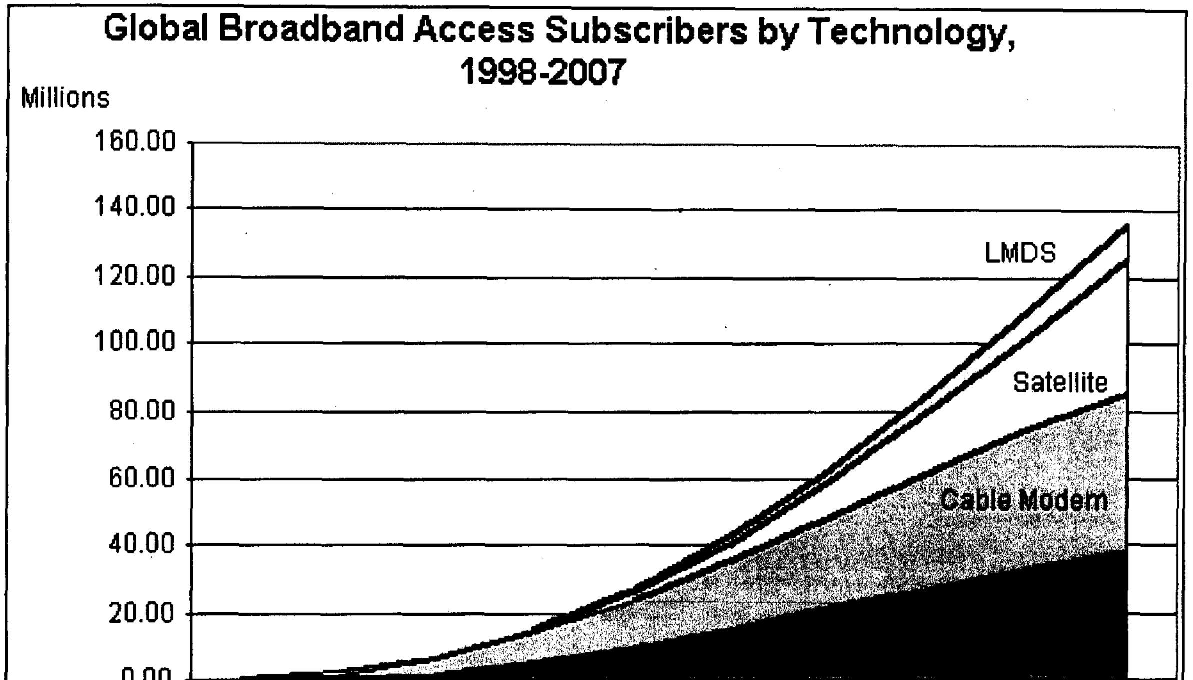
cc (w/encl.): Donald Abelson
Cecily Holiday
Harry Ng
Peter Papas
Kimberly Baum
Jennifer Gilsenan
Julius P. Knapp
Geraldine A. Matise
Thomas Derenge
Bruno Pattan

Introducing a Quantum Step in NGSO Orbital and Spectral Efficiency

An Alternative to the present NGSO Approach

SATELLITE MARKET

- The satellite industry's market share is expected to reach 30% of total access broadband users by 2007.



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LMDS	0.00	0.07	0.26	0.85	1.54	2.56	4.00	5.95	8.34	11.16
Satellite	0.03	0.07	0.20	0.65	1.90	4.58	10.49	18.48	27.64	39.62
Cable Modem	0.57	1.52	4.24	8.54	13.72	19.99	26.86	34.33	41.00	46.78
xDSL	0.20	0.69	2.20	5.32	9.93	15.57	21.45	27.20	33.00	38.49

Source: Pioneer Consulting, 1998

virtual geo

But The Skies Are Filling!!

- 36 MHz-equivalent transponders expected to increase from 5,281 in 1997 to 8,506 in 2003 -- a 61% increase in 5 years
- By 2008, expected increase to 13,699 36 MHz-equivalent transponders -- a 159% increase over 10 years
- Expansion will more than exhaust the available orbital slots for C- and Ku-band

Additional Supply Needed to Maintain 15% Margin Over Demand

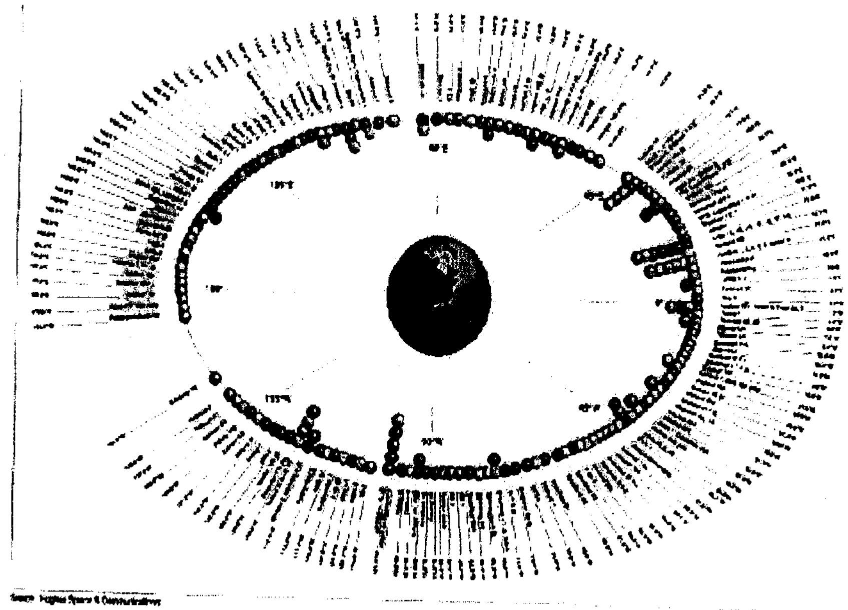
	2000	2001	2002	2003	2004
Additional Transponders Needed	**390**	**1,250**	**2,515**	**3,880**	**4,949**

Source: Merril Lynch

virtual geo

Valuable Real Estate

The crowding of the GEO Arc has exposed the value of "Real Estate" in space



Recent Investments into Traditional GEO Systems

- MCI-$682.5 million 1996 auction of 110° W.L
- Echostar-$53 million 1996 auction of partial 148 ° W.L
- AOL-$1.5 billion investment into Hughes DirectTV & DirectPC
- Microsoft- Investment/Partnership with Echostar

Recent Investments into planned Ka and Non-GEO systems

- Liberty Media-$425 million investment into Astrolink
- Telecom Italia-$250 million into Astrolink
- Teledesic-$1.5 billion in commitments from Motorola, Boeing, Gates, McCaw, etc.
- Hughes - $1.4 billion authorized for Spaceway

The FCC Recently Opened a Filing Window for Non-GEO Fixed Systems

Virtual Geosatellite LLC has proposed

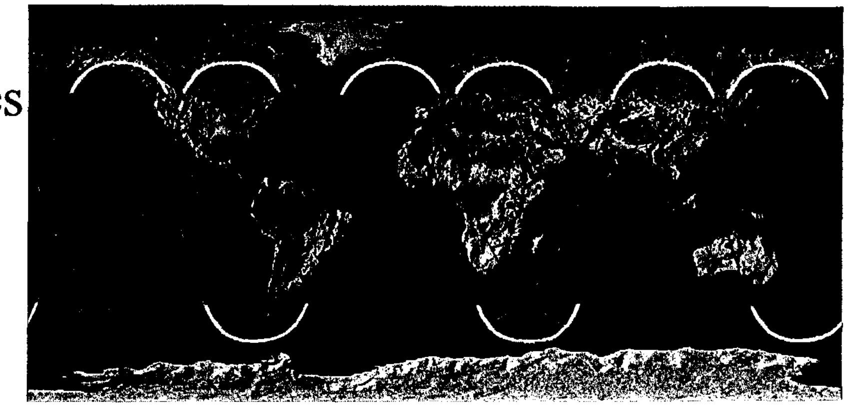
VIRGO

Serving Broadband Users Worldwide

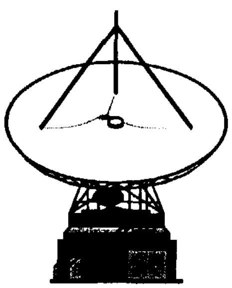
virtual geo

Virgo

- A global space-based networking and internet access service
- Using a patented* Virtual GEO elliptical constellation of satellites
  - Optimize coverage of land masses
  - Minimize interference to other services



- Supports:



  - High speed, multi-megabit per second digital traffic and applications
  - Modest sized user terminals (18” antennas)
  - Locations anywhere on the Globe, pole to pole

*patent no’s 5,845,206; 5,957,409; and others pending

virtual geo

High Speed, Low Cost Access!

- Cheaper than LEOs:
  - Hundreds of short-life LEOs are prohibitively costly to operate, and maintain.
- Comparable to GEOs:
  - 5-satellite Virtual Geostationary ("Virtual GEO") constellation similar to 3-GEO constellation,
    - Smaller satellite for same capability
    - Lower overall launch costs — lower total ΔV & lower wt/sat
  - With better hemispheric coverage and elevation angles.
- Competitive service pricing

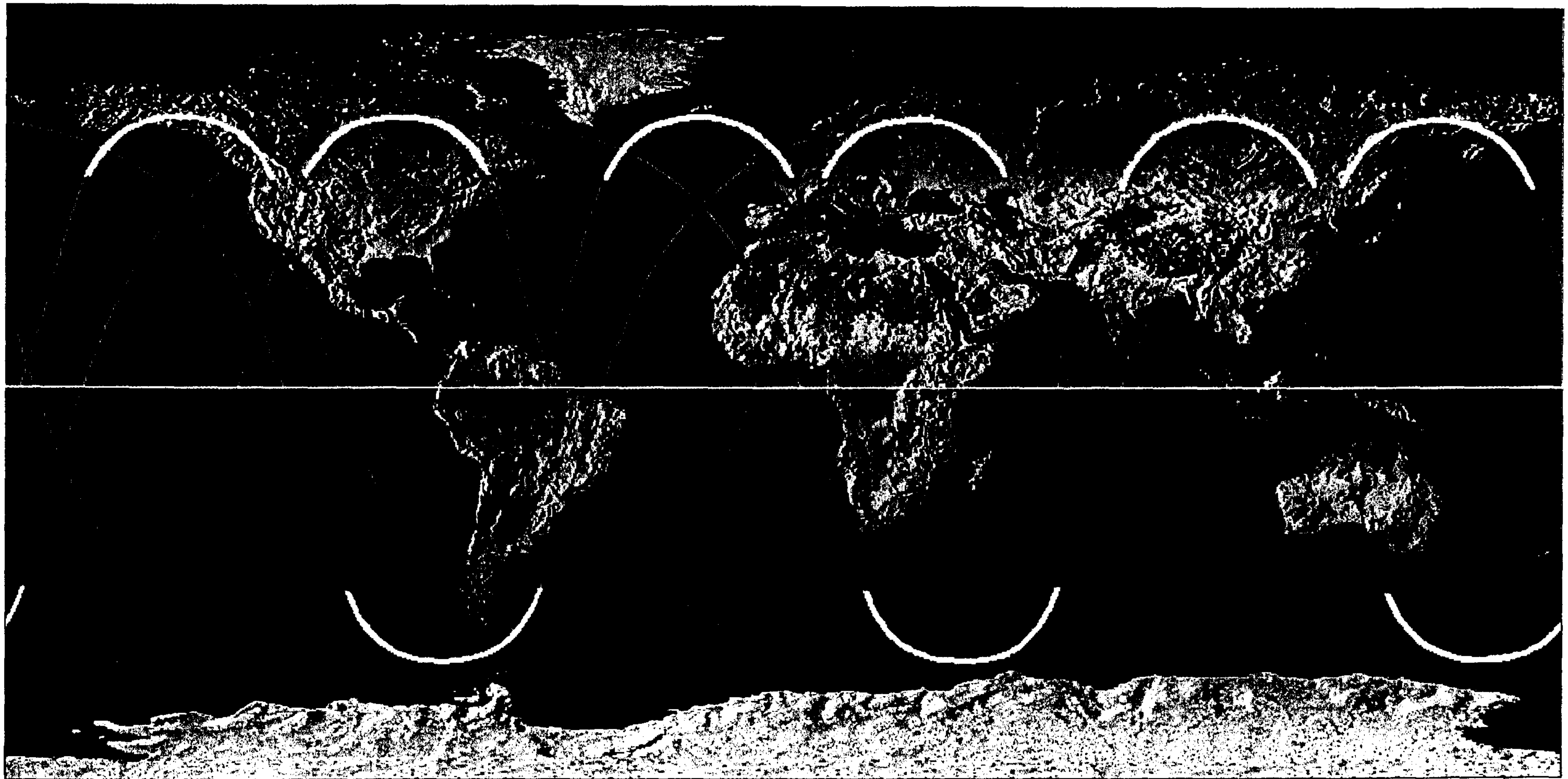
Virtual GEO orbits and slots are the secret to success!!

virtual geo

What are Virtual Geostationary Orbits??

What are their Benefits?

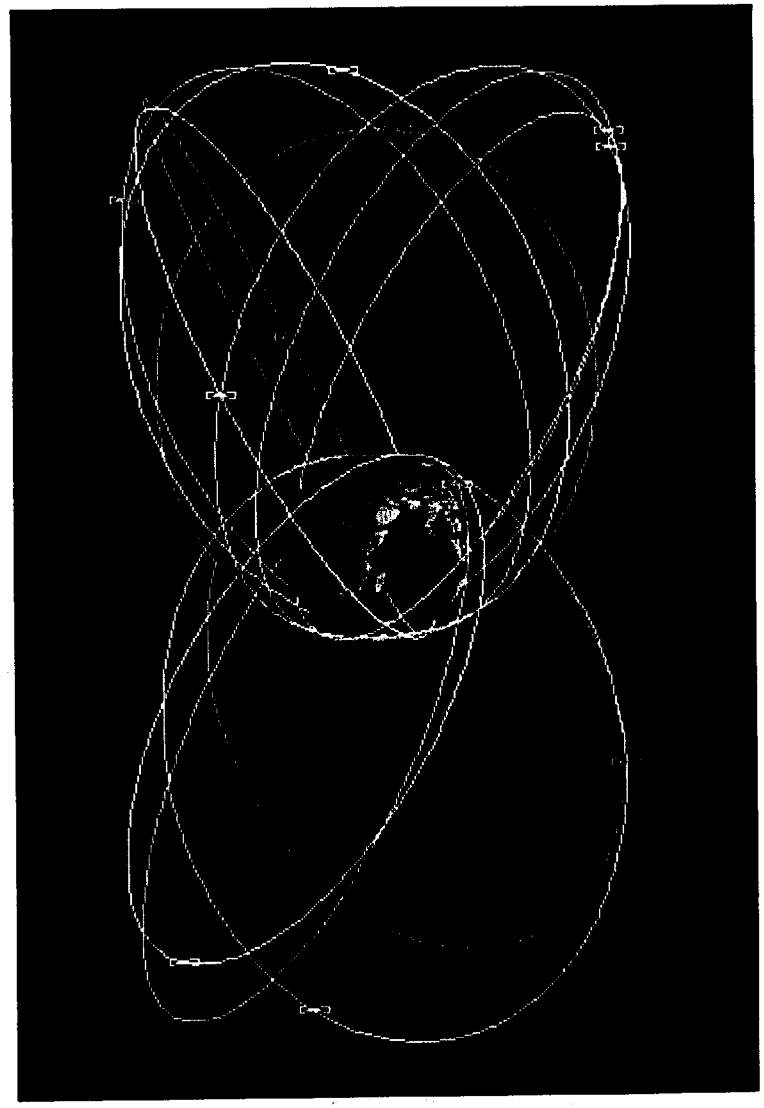
Virtual GEO Active Arcs



virtual geo

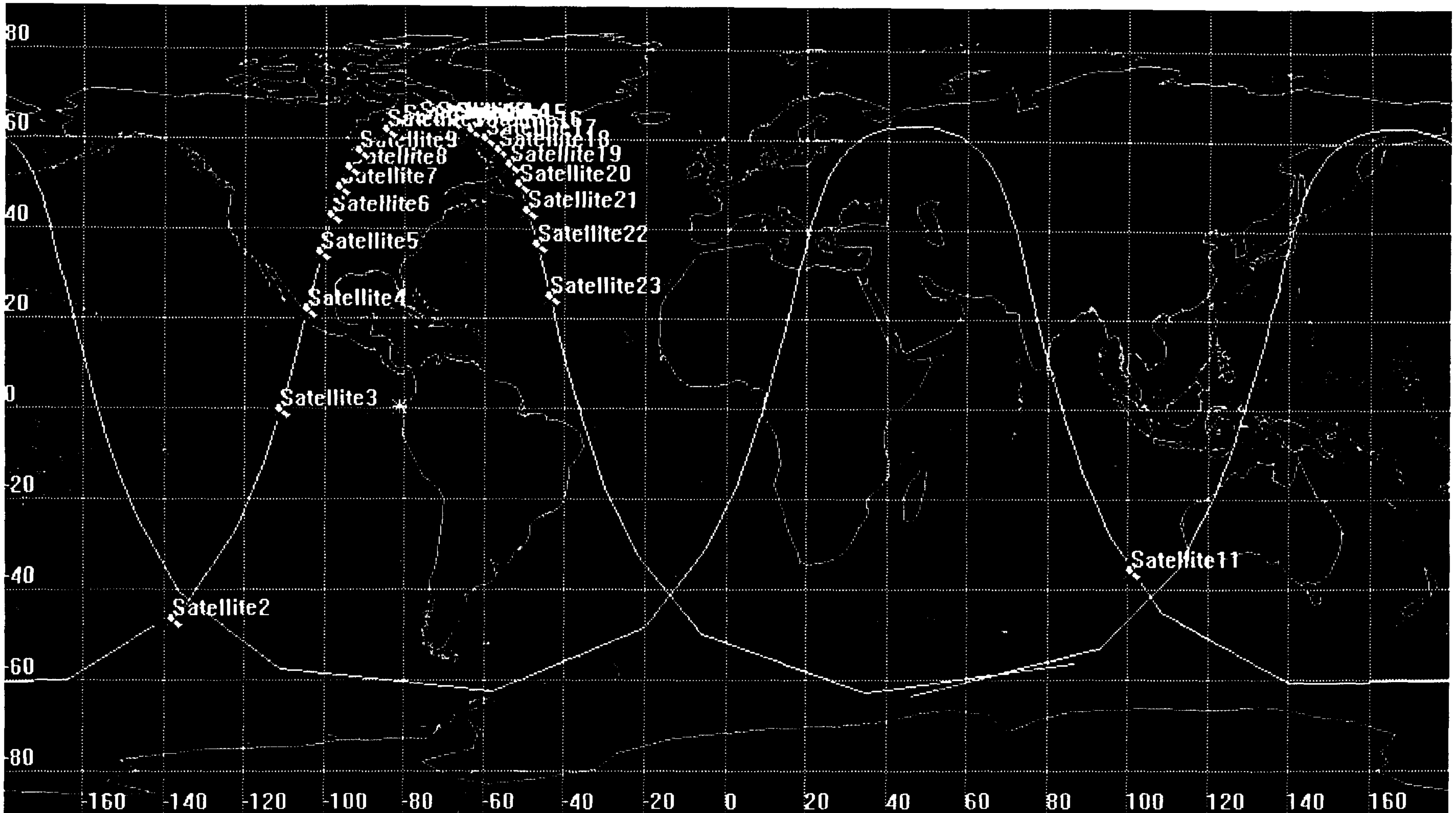
Virtual GEO Orbits

- General
  - 15 Satellites:
  - 3 ground tracks of 5 each
  - Spares
    - One available to each ground track
  - 8 hour elliptical, critically inclined orbits, 1 plane per satellite



virtual geo

Virtual GEO Slots



virtual geo

Business Potential of Virtual GEO Orbits

The VGS "Virtual Slot"

- 12 Possible Active Arcs (6 in Northern Hemisphere, 6 in Southern)
- Approximately 2 degrees of separation at apogee between satellites create GEO-like slots
- Space at a minimum for 288 satellites -- 168 active at any given time

Number of "Businesses"

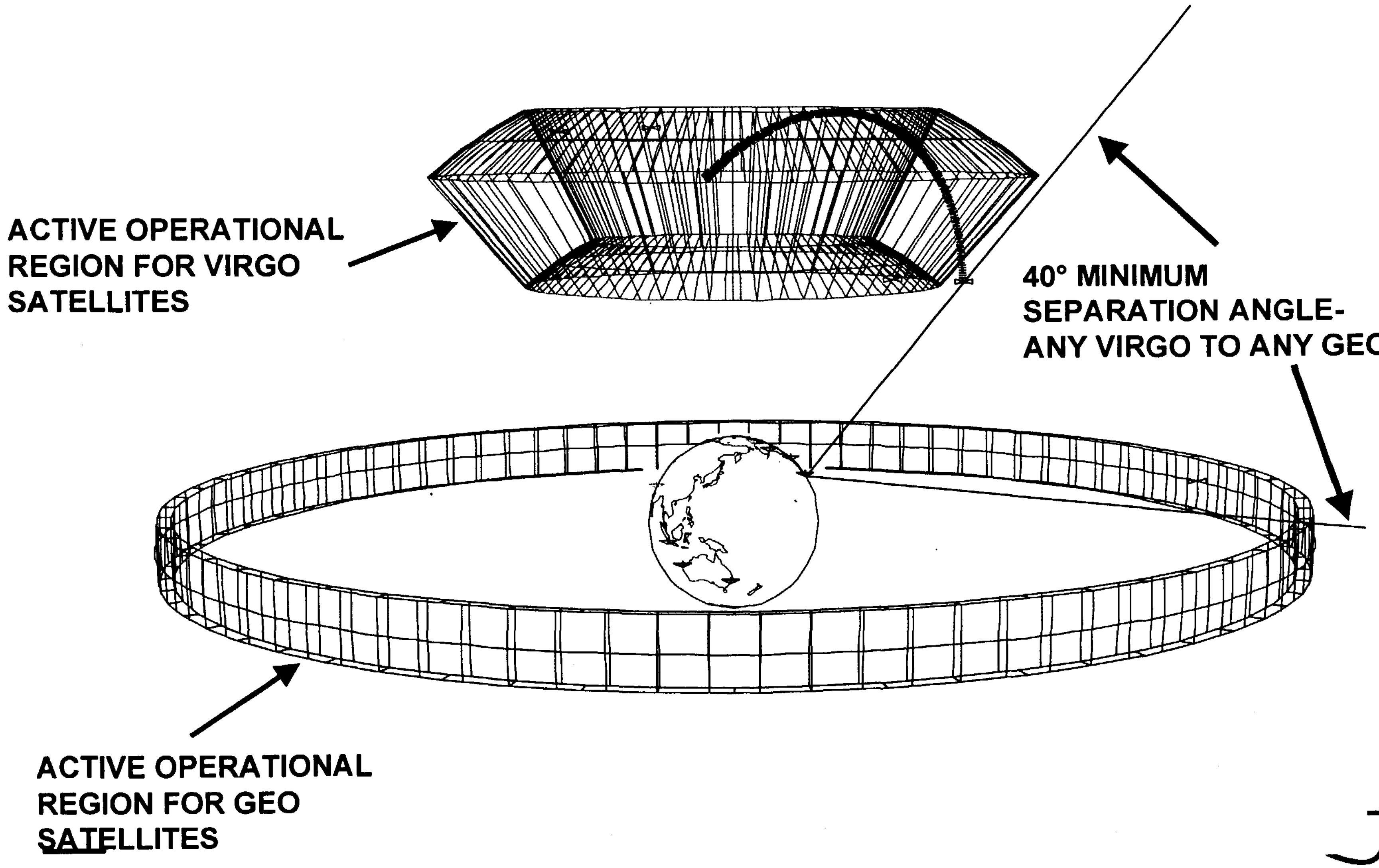
At a minimum...

- 28 full global systems or…
- 56 hemispheric systems or...
- 168 regional satellite operators

virtual geo

Virtual GEO and Band Sharing

Comparison of Virtual GEO and GSO Operating Regions



virtual geo

Relative GSO Arc Protection Factors

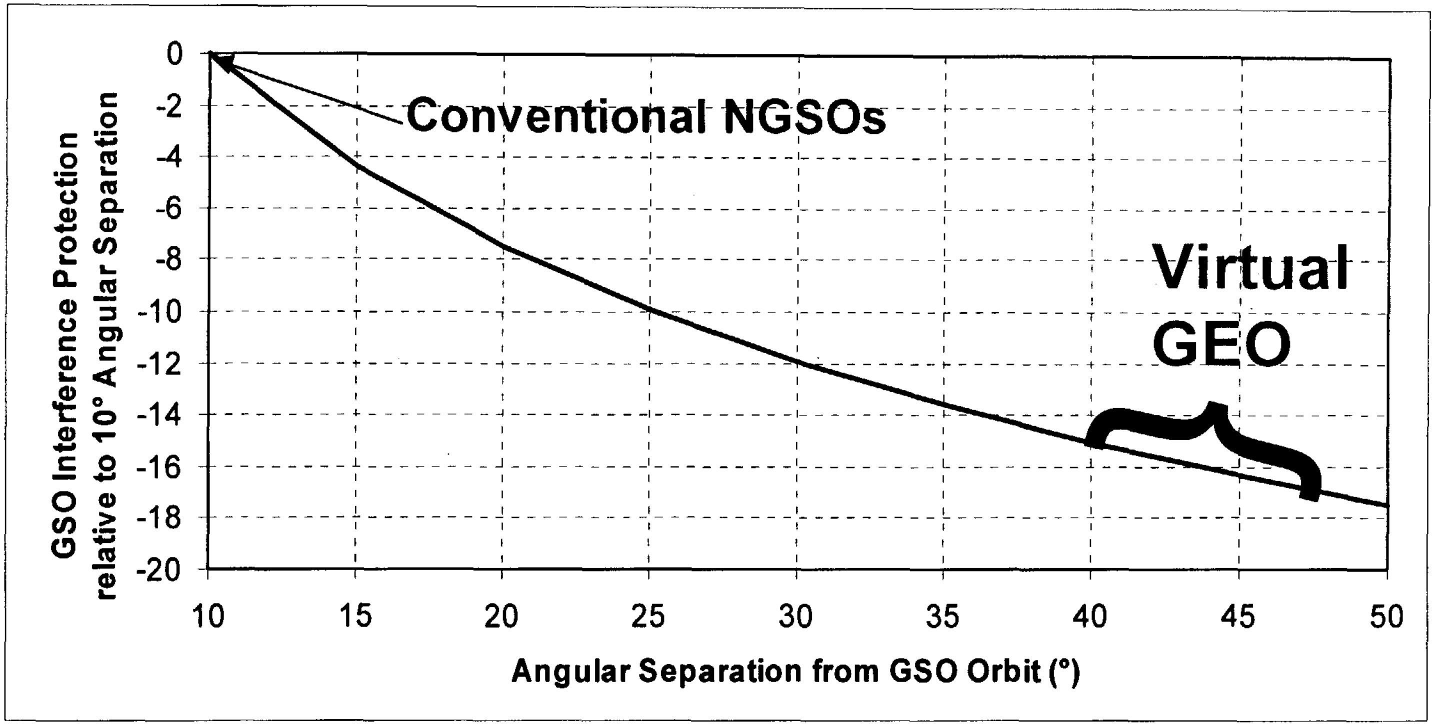


Chart based upon 25logΘ rolloff

Interference to C-Band GSO Earth Station

3.7 - 4.2 Ghz

Maximum PFD of VIRGO™ satellite in 4 kHz	**-165**	**dBW / m^2 / 4kHz**
GSO orbit avoidance angle	**40**	**°**
GSO Rx Earth Station gain towards VIRGO™ satellite	-8.1	dBi
Frequency	4000	MHz
Effective Aperture of GSO Rx Earth Station towards VIRGO™ satellite	-41.5	dB-m^2
GSO Rx Earth Station Interfering Signal Power in 4 kHz	-206.5	dBW / 4kHz
GSO Rx Earth Station Interfering Signal Power Spectral Density	-242.6	dBW / Hz
Increase in interference due to 3 simultaneously visible VIRGO™ satellites	4.8	dB
GSO Rx Earth Station Interfering Signal Power Spectral Density (3 VIRGO™ satellites)	-237.8	dBW / Hz
GSO Rx Earth Station System Noise Temperature	**80**	**K**
GSO Rx Earth Station System Noise Power Spectral Density	-209.6	dBW / Hz
I_0/N_0 at GSO Rx Earth Station Input	**-28.2**	**dB**

ΔT/T Degradation to Earth Station 0.15%

virtual geo

Interference to C-Band GSO Satellite Receiver

5.925 - 6.425 Ghz

	Clear Sky	Rain	
Maximum PSD into VIRGO™ Earth Station Antenna in 4 kHz	**-25.0**	**-21.8**	**dBW / 4kHz**
GSO orbit avoidance angle	**40**	**40**	**°**
VIRGO™ Tx Earth Station gain towards GSO Satellite	-4.1	-4.1	dBi
VIRGO™ Tx Earth Station EIRP Spectral Density towards GSO Satellite in 4 kHz	-29.1	-25.9	dBW / 4kHz
PFD at the GSO Satellite in 4 kHz	-191.2	-188.0	dBW / m^2 / 4kHz
Frequency	6325	6325	MHz
Assumed Gain of GSO Satellite Rx towards VIRGO™ Earth Station	**40**	**40**	**dBi**
Effective Aperture of GSO Satellite Rx towards VIRGO™ Earth Station	2.5	2.5	dB-m^2
GSO Satellite Rx Interfering Signal Power in 4 kHz	-188.6	-185.4	dBW / 4kHz
GSO Satellite Rx Interfering Signal Power Spectral Density (one VIRGO™ earth station)	-224.7	-221.5	dBW / Hz
GSO Satellite Rx Interfering Signal Power Spectral Density (two VIRGO™ earth stations)	-221.7	-218.5	dBW / Hz
GSO Satellite Rx System Noise Temperature	**600**	**600**	**K**
GSO Satellite Rx System Noise Power Spectral Density	-200.8	-200.8	dBW / Hz
I_0/N_0 at GSO Satellite Rx Input	**-20.8**	**-17.6**	**dB**

$\Delta T/T$ Degradation to Satellite Receiver 0.82% (1.7% rain)

virtual geo

Virtual GEO Coverage and Protection to FS

- **Coverage optimized over land masses**
  - US Coverage — Improvement Factor*
    - *Always > 42 degrees in CONUS* — *23 dB*
    - *>30 degrees for VI, PR* — *19 dB*
    - *>35 degrees for Hawaii* — *21 dB*
  - Global Coverage: - Elevation Angles
    - *Exceed 30 degrees for 50% of land areas* — *19 dB*
    - *Exceed 20 degrees for 90% of land areas* — *15 dB*
    - *Exceed 10 degrees for 99.9% of coverage area* — *8 dB*
  - Lowest elevation angles occur off land over Atlantic, Indian, and Pacific Oceans

* *Relative to 5° minimum elevation angle*

virtual geo

Present Route to NGSO Operations — Suboptimum?? — A Missed Opportunity??

- The GSO arc is a coordinated, agreed-upon orbit
  - Offers visibility advantages — positioning over desired markets
  - Greatly facilitates frequency sharing among many systems
- NGSO systems presently use uncoordinated orbits
  - Frequent crossing interference events
    - ***More systems add more crossing interference to everyone***
  - Limited entry possible
    - ***Possible requirement for spectrum subdivision — limiting capacity***
    - ***Possible exclusion of future entrants***
  - Expensive, non-productive measures necessary to limit effects of crossing interference
    - Diversity — more satellites or ground stations needed
    - Interruptions
  - Limited isolation from GSO

virtual geo

Virtual Geostationary Arcs
A New Allocation Resource!

- Virtual Geostationary arcs create new GSO-like opportunities
  - *Visibility advantages — loitering over desired markets*
  - *Many more systems possible*
    - *No Crossing interference*
  - *Additional interference mitigating resources not required*
  - *More and often better choices for satellite positioning*
  - *No interference to GSO arc or to each other*
  - *Future entry not barred*